Claims

[c1]   1. A method for initializing a new node in a network comprising:

adding a new node to a network having a plurality of nodes;

sending a query automatically to said plurality of nodes to determine what contents to download;

receiving replies to said query from a subset of said plurality of nodes having said contents for said new node;

downloading desired portions of said contents from said subset of said plurality of nodes having said contents.

[c2]   2. The method of claim 1, wherein said network comprises a packetcommunication network.

[c3]   3. The method of claim 1, wherein said plurality of nodes is arranged in the form of a virtual tree for passing control information, and said new node is a node of said tree.

[c4]   4. The method of claim 3, wherein each node of said plurality of nodes has a set of attributes and a set of rolled up attributes for identification, said query comprising said set of attributes and said set of rolled up attributes of said new node.

[c5]   5. The method of claim 4, wherein said set of attributes comprises a bitmap and said set of rolled up attributes comprises a combination of the set of attributes of all lineal descendants of said node.

[c6]   6. The method of claim 5, wherein said combination comprises the binary OR of said all lineal descendants of said node.

[c7]   7. The method of claim 3, wherein said sending said query automatically to said plurality of nodes comprises:

announcing said new node's inclusion in said network by sending a notification to at least one neighbor node;

forwarding said notification to nodes neighboring said at least one neighbor node, said forwarding continuing until each of said plurality of nodes in said

network receives said notification.

[c8]   8. The method of claim 7, wherein said new node does not receive said notification from a neighbor node.

[c9]   9. The method of claim 8, wherein said content is stored as block files in said plurality of nodes having said content.

[c10]   10. The method of claim 9, wherein each of said replies from a replying node comprises:
identification of what content said new node should have;
identification of portions of said content available in said replying node; and
performance characteristics of said replying node.

[c11]   11. The method of claim 10, wherein said downloading said desired portion of said content comprises downloading a desired subset of said block files from said replying nodes in close proximity identified as least congested.

[c12]   12. The method of claim 11, wherein said least congested is determined from said performance characteristics.

[c13]   13. The method of claim 11, wherein said nodes in close proximity comprise nodes having the least latency.

[c14]   14. The method of claim 11, wherein said downloading said desired subset of block files is performed in parallel from said least congested nodes.

[c15]   15. A method for initializing a new node in a network comprising:
adding a new node to a network having a plurality of nodes, wherein said plurality of nodes is arranged in the form of a virtual tree and said new node is a node of said tree, each node of said tree having a set of attributes and a set of rolled up attributes for identification;
sending a query from said new node to said plurality of nodes to determine what contents to download, said contents being stored as block files in one or more nodes of said network;
receiving replies to said query from a subset of said plurality of nodes having

said contents for said new node;

downloading desired portions of said contents from said subset of said plurality of nodes having said contents.

[c16]   16. A method for initializing a new node in a network comprising:

adding a new node to a network having a plurality of nodes, wherein said plurality of nodes is arranged in the form of a virtual tree and said new node is a node of said tree, each node of said tree having a set of attributes and a set of rolled up attributes for identification;

sending a query automatically from said new node to said plurality of nodes to determine what contents to download, said content being stored as block files in one or more nodes of said network, said query comprising said set of attributes and said set of rolled up attributes for said new node;

receiving replies to said query from a subset of said plurality of nodes having said contents for said new node, wherein each of said replies identifies what subset of said block files is available in a replying node and performance characteristics of said replying node;

downloading desired subsets of said block files from said replying nodes that are least congested.

[c17]   17. A computer program product comprising:

a computer usable medium comprising computer readable code for initializing a new node in a network, said computer readable program code configured to:

add a new node to a network having a plurality of nodes;

send a query automatically to said plurality of nodes to determine what content said new node should have;

receive replies to said query from a subset of said plurality of nodes having said content for said new node;

download a desired portion of said content from said subset of said plurality of nodes having said content.

[c18]   18. The computer program product of claim 17, wherein said network comprises a packet-communication network.

[c19] 19. The computer program product of claim 17, wherein said plurality of nodes is arranged in the form of a virtual tree and said new node is a node of said tree.

[c20] 20. The computer program product of claim 19, wherein each node of said plurality of nodes has a set of attributes and a set of rolled up attributes for identification, said query comprising said set of attributes and said set of rolled up attributes of said new node.

[c21] 21. The computer program product of claim 20, wherein said set of attributes comprises a bitmap and said set of rolled up attributes comprises a combination of the set of attributes of all lineal descendants of said node.

[c22] 22. The computer program product of claim 21, wherein said combination comprises the binary OR of said all lineal descendants of said node.

[c23] 23. The computer program product of claim 19, wherein said send a query automatically to said plurality of nodes comprises:
announcing said new node's inclusion in said network by sending a notification to at least one neighbor node;
forwarding said notification to nodes neighboring said at least one neighbor node, said forwarding continuing until each of said plurality of nodes in said network receives said notification.

[c24] 24. The computer program product of claim 23, wherein said new node does not receive said notification from a neighbor node.

[c25] 25. The computer program product of claim 24, wherein said content is stored as block files in said plurality of nodes having said content.

[c26] 26. The computer program product of claim 25, wherein each of said replies from a replying node comprises:
identification of what content said new node should have;
identification of portions of said content available in said replying node; and
performance characteristics of said replying node.

[c27]   27. The computer program product of claim 26, wherein said download said desired portion of said content comprises computer program product configured to download a desired subset of said block files from said replying nodes in close proximity identified as least congested.

[c28]   28. The computer program product of claim 27, wherein said least congested is determined from said performance characteristics.

[c29]   29. The computer program product of claim 27, wherein said nodes in close proximity comprise nodes having the least latency.

[c30]   30. The computer program product of claim 27, wherein said download said desired subset of block files is performed in parallel from said least congested nodes.

[c31]   31. An apparatus for initializing a new node in a network comprising:
a network having a plurality of nodes, each of said plurality of nodes having one or more distribution servers in a distribution server cluster, said plurality of nodes having one or more content for distribution in said network;
a new node added to said network, said new node sending a query automatically to said plurality of nodes to determine what contents to download, said new node receiving replies to said query from a subset of said plurality of nodes having said contents for said new node, said one or more distribution servers in said distribution server cluster in said new node downloading desired portions of said contents from said subset of said plurality of nodes having said contents.

[c32]   32. The apparatus of claim 31, wherein said network comprises a packet-communication network.

[c33]   33. The apparatus of claim 31, wherein said plurality of nodes is arranged in the form of a virtual tree and said new node is a node of said tree.

[c34]
34. The apparatus of claim 33, wherein each node of said plurality of nodes has a set of attributes and a set of rolled up attributes for identification, said query

comprising said set of attributes and said set of rolled up attributes of said new node.

[c35]   35. The apparatus of claim 34, wherein said set of attributes comprises a bitmap and said set of rolled up attributes comprises a combination of the set of attributes of all lineal descendants of said node.

[c36]   36. The apparatus of claim 35, wherein said combination comprises the binary OR of said all lineal descendants of said node.

[c37]   37. The apparatus of claim 33, wherein said sending a query automatically to said plurality of nodes comprises:
announcing said new node's inclusion in said network by sending a notification to at least one neighbor node;
forwarding said notification to nodes neighboring said at least one neighbor node, said forwarding continuing until each of said plurality of nodes in said network receives said notification.

[c38]   38. The apparatus of claim 37, wherein said new node does not receive said notification from a neighbor node.

[c39]   39. The apparatus of claim 38, wherein said content is stored as block files in said plurality of nodes having said content.

[c40]   40. The apparatus of claim 39, wherein each of said replies from a replying node comprises:
identification of what content said new node should have;
identification of portions of said content available in said replying node; and
performance characteristics of said replying node.

[c41]   41. The apparatus of claim 40, wherein said downloading said desired portion of said content comprises downloading a desired subset of said block files from said replying nodes in close proximity identified as least congested.

[c42]   42. The apparatus of claim 41, wherein said least congested is determined from said performance characteristics.

[c43]   43. The apparatus of claim 41, wherein said nodes in close proximity comprise nodes having the least latency.

[c44]   44. The apparatus of claim 41, wherein said downloading said desired subset of block files is performed in parallel from said least congested nodes.